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Kew Bulletin, Vol. 51, No. 2. (1996), pp. 385-391.

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Notes on *Sphaerosporella* (Pezizales), with reference to British records

Y.-J. YAO^{1,2} & B.M. SPOONER¹

Summary. Notes on the taxonomy and nomenclature of the genus *Sphaerosporella* are presented. Only one species, *S. brunnea*, is recognised. *Sphaerosporella hinnulea* is reduced to synonymy with *S. brunnea*. The habitat of *S. brunnea* is considered to be burnt sites of various age. *Peziza schizospora*, here lectotypified, and *P. confusa* are confirmed to be synonymous with *S. brunnea*. *Sphaerosporella phillipsii* is considered to be a *nomen dubium*.

INTRODUCTION

The distinction between *Sphaerosporella* (Svrček) Svrček & Kubička and *Trichophaea* Boud. has been maintained by some authors largely on the basis of artificial characters, notably spore shape. The type species *S. brunnea* (Alb. & Schwein.) Svrček & Kubička, was combined in *Trichophaea* by Batra & Batra (1963), a conclusion which was followed by, amongst others, Hennebert (1973) and Korf (1973). This may be an appropriate solution, especially when the similarity of anamorphic states, which in the present species and in others referred to *Trichophaea* belong to *Dichobotrys* Hennebert (Hennebert 1973), is considered. However, the further problem of the relationship between *Trichophaea* and *Humaria* Fuckel, as discussed by Eckblad (1968), also requires consideration if these genera are accepted as synonymous, as does the generic position of *T. saccata* (H. C. Evans) Korf, a curious species with closed apothecia and saccate asci. In the present paper the genus *Sphaerosporella* is maintained for convenience until the other problems have been more fully considered.

Svrček (1948) recognised *Sphaerospora* (Sacc.) Sacc. as a genus, including two new subgenera, *Eusphaerospora* Svrček and *Sphaerosporella* Svrček. Under subgen. *Sphaerosporella* he segregated smooth-spored species from those with ornamented ascospores. Subsequently, those with ornamented ascospores were included in *Scutellinia* (Cooke) Lambotte (see Schumacher 1990, Yao & Spooner 1995b), and *Sphaerospora* is currently considered a synonym of the latter. The subgenus *Sphaerosporella*, however, was raised to generic rank by Svrček & Kubička (1961).

When first described, subgen. *Sphaerosporella* included two species, *Sphaerospora brunnea* (Alb. & Schwein.) Masee, with a form *S. brunnea* f. *sordida* (Velen.) Svrček, and *S. ochracea* (Rehm) Velen., but no type was indicated (Svrček 1948). When

Accepted for publication November 1995.

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raising this subgenus to generic rank, Svrček & Kubička (1961) designated *Peziza brunnea* Alb. & Schwein. as the type species and combined it as *Sphaerosporella brunnea* (Alb. & Schwein.) Svrček & Kubička. Typification of the generic name *Sphaerosporella* is dependent on that of *Sphaerospora* subgen. *Sphaerosporella*. As *Peziza brunnea* is one of the original species included in the subgenus, Svrček & Kubička (1961) may, in fact, be regarded as having selected a lectotype species for *Sphaerospora* subgen. *Sphaerosporella* (see Art. 9.8, ICBN). Subsequent publications often simply referred to it as the type species (e.g. *Index of Fungi*, vol. 3: 93, 1962; Rifai, 1968), and, furthermore, no reference to the lectotypification was given in *Index Nominum Genericorum* (Farr *et al.* 1979).

Investigation of British species referred to *Sphaerosporella*, and examination of the types, has led to the conclusion that *S. hinnulea* is synonymous with *S. brunnea*. This is discussed below, together with other relevant names which have appeared in the British literature as well as some European names. Material and methods are those outlined in Yao & Spooner (1995a).

TAXONOMY AND NOMENCLATURE

Distinction between *Sphaerosporella brunnea* and *S. hinnulea* was maintained by Seaver (1928), as *Sphaerospora brunnea* (Alb. & Schwein.) Masee and *S. hinnulea* (Berk. & Broome) Masee, based on apothecial diameter, growth habit and habitat, i.e. apothecia 1–6 mm diam., forming congested masses on burnt places for the former and apothecia reaching 1 cm, scattered on sandy soil in woods for the latter species. Additionally, 'more obvious reddish coloration of the discs of *Sphaerosporella hinnulea* and the presence of some shades of purple in its young apothecia' were emphasised as distinguishing characters by Rifai (1968). However, doubt as to the distinction between these two taxa was expressed by Masee (1895) when he made the combinations in *Sphaerospora*. Masee stated that *S. hinnulea* is 'Very closely allied to *S. brunnea*, if indeed truly distinct', although he added, 'differing mainly in the reddish tone of the ascophore [= apothecium], shorter marginal hairs, and hyaline paraphyses'. Apothecial colour is evidently a variable character in this species and is very subjective, as a range of colour terms has been employed by various authors; hymenium colour was described as 'pale- to dark-brown' for *Sphaerospora brunnea* and 'reddish-brown' for *S. hinnulea* by Seaver (1928), whilst in his key to species 'reddish-brown' was used in the couplet for both taxa. Similarly, 'fawn-colour to reddish-brown' was given for *S. hinnulea* and 'pale yellow' for *S. brunnea* by Masee (1895). *Sphaerosporella brunnea* was also described as having a pale brown to brown or reddish brown disc by Rifai (1968). A further example is that the colour of *Peziza confusa* Cooke was given as 'fusca' [= sombre brown] by Cooke (1876b) himself, whilst the name has been cited as a synonym under both *Sphaerospora brunnea* (Seaver 1928) and *Sphaerosporella hinnulea* (Rifai 1968).

Although *S. hinnulea* was described in the protologue as 'on soil amongst grass', examination of the type material reveals small fragments of charcoal in the substrate. The fungus evidently grew on a previously burnt site, the usual habitat of *S. brunnea*. There is, therefore, no clear difference with regard to colour or habitat between *S. hinnulea* and *S. brunnea*. Recently, *S. brunnea* was maintained as a distinct

species by Häffner (1987). From the description of *S. brunnea* and of *S. hinnulea* which he provided, no significant morphological differences can be determined, although the loosening perispore described for *S. hinnulea* was a novel observation. The roadside habitat which Häffner reported for *S. hinnulea* does not necessarily exclude the possibility of burning.

A description of *S. brunnea* based on examination of types, and a list of synonyms, mainly of names which appear in British literature, and of basionyms are provided below.

Sphaerosporella brunnea (Alb. & Schwein.: Fr.) Svrček & Kubička in Česká Mykol. 15: 65 (1961). Neotype (Rifai 1968): in Carboneum, Herb. Schweinitz (K!).

Peziza brunnea Alb. & Schwein., Consp. Fung. Lusat. 317, Tab. IX, Fig. 8 (1805): Fr., Syst. Myc. 2: 83 (1822).

Lachnea brunnea (Alb. & Schwein.) Gillet, Champ. France Discomyc.: 72 (1879).

Sphaerospora brunnea (Alb. & Schwein.) Masee, Brit. Fung. Fl. 4: 295 (1895).

Ciliaria brunnea (Alb. & Schwein.) Boud., Hist. Classific. Discomyc. Europe: 62 (1907).

Trichophaea brunnea (Alb. & Schwein.) L. R. Batra, in Batra & Batra in Univ. Kansas Sci. Bull. 44: 167 (1963).

Peziza hinnulea Berk. & Broome in Ann. Mag. Nat. Hist. Ser. 4, 7: 433 (1871). Type: Powerscourt, 27 Sept. 1867, ex Herb. Berkeley and Herb. Broome (K!).

Ciliaria hinnulea (Berk. & Broome) Boud., Hist. Classific. Discomyc. Europe: 62 (1907).

Scutellinia hinnulea (Berk. & Broome) Dennis, Brit. Cup Fungi: 26 (1960).

Sphaerosporella hinnulea (Berk. & Broome) Rifai in Verh. Kon. Ned. Akad. van Wetensch., Afd. Natuurk, Tweede Sect. 57 (3): 100 (1968).

Peziza schizospora W. Phillips in Cooke in Grevillea 3: 31, pl. 30, Fig. 59 (1874).

Lectotype (here selected): on charcoal bed, Arkole (=Arcoll), 23 Sept. 1872, ex Herb. W. Phillips (K!).

Barlaea schizospora (W. Phillips) Sacc., Syll. Fung. 8: 116 (1889).

Ciliaria schizospora (W. Phillips) Boud., Hist. Classific. Discomyc. Europe: 62 (1907).

Peziza confusa Cooke in Bull. Buffalo Soc. Nat. Sci. 2: 291 (1875). Type: USA, New York, Poughkeepsie, on clay in loamy soil, summer, Gerard (ex Herb. Cooke, K!)

Sphaerospora confusa (Cooke) Sacc., Syll. Fung. 8: 190 (1889).

Lachnea confusa (Cooke) W. Phillips in Grevillea 18: 83 (1890), [not listed by Sarccado].

Ciliaria confusa (Cooke) Boud., Icon. Mycol. Liste Prél.: (3) [without pagination] (1904).

Apothecia gregarious to sometimes scattered, often densely crowded, 2 – 6(– 10) mm diam. *Disc* concave to flat, pale brown or yellowish-brown to reddish-brown. *Receptacle* shallowly cupulate, sessile, bearing coloured hairs, externally slightly darker or concolorous. *Hairs* superficial, reddish brown to pale brown, sometimes almost colourless, 50 – 130(– 200) × 8.0 – 13.0(– 22.0) µm, cylindric or slightly tapering to an obtuse or pointed apex, flexuous and adpressed, 1 – 5-septate, bunched near the

margin. *Ectal excipulum* of *textura angularis*, cells pale brown. *Medullary excipulum* of *textura intricata*, thin, with cells often inflated or irregularly lobed. *Asci* cylindrical to clavately cylindrical, operculate, I-, thin-walled, $180 - 210 \times 16.0 - 19.0 \mu\text{m}$, uniseriately 8-spored. *Ascospores* globose, unicellular, colourless, $14.0 - 18.5(-20.0) \mu\text{m}$ diam., smooth, guttulate, with a de Bary bubble in some mountants. *Paraphyses* filiform, septate, simple, enlarged at the apex to $6.0 - 8.5 \mu\text{m}$ diam.

SPECIMENS EXAMINED. NORTH AMERICA: *s. loc.*, In Carboneum, Herb. Schweinitz (neotype of *Sphaerospora brunnea*, K); USA, New York, Poughkeepsie, 'on clay in loamy soil', summer, Gerard (type of *Peziza confusa*, ex Herb. Cooke, K); New York, Poughkeepsie, 'on clay bank', Gerard (apparently an isotype of *Peziza confusa*, ex Herb. W. Phillips, K).

FINLAND: Merimasku, 17 June 1860, Karsten F.F. Exs. No. 528 (authentic material of *Peziza confusa*, two parts in K).

ENGLAND: Powerscourt, 27 Sept. 1867, ex Herb. Berkeley and Herb. Broome (type of *Peziza hinnulea*, two packets, K); Arkole [N.B. = Arcoll, in Wrekin, about seven miles south of Shrewsbury], on charcoal bed, 23 Sept. 1872, ex Herb. W. Phillips (lectotype of *Peziza schizospora*, K); Arkole, charcoal bed, Sept. 1872, ex Herb. W. Phillips (possibly part of the original material of *Peziza schizospora*, K); Shrewsbury on charcoal bed, Sept. 1872, *s. leg.*, ex Herb. Berkeley (possibly part of the original material of *Peziza schizospora*, K); Warwickshire, near Sutton Coldfield, Sutton Park, on burnt ground, 18 Sept. 1960, James (named as *Ciliaria confusa*, K); Surrey, Esher Common, near Black Pond, on burnt ground, 4 Aug. 1991. Læssøe & Spooner (K).

DISTRIBUTION. Europe, Asia, North America and Australasia.

HABITAT. On new or old burnt ground and charcoal heaps, sometimes amongst mosses.

The protologue of *Peziza schizospora* includes only a name and drawings of an ascus and ascospores. The taxon was later fully described in Cooke (1875b) and in Phillips (1887). It was distinguished from *P. hinnulea* based on the 'external cells of the cup' (Cooke 1875b) and, in addition, lacking 'any short hairs' (Phillips 1887). It was also subsequently described as hairless (e.g. Masee 1895, Rifai 1968). Examination of what is clearly the original material from Arkole, collected in 1872, preserved in Herb. W. Phillips and in Herb. Berkeley, now in K, reveals that there are poorly developed hairs on the apothecium, usually 1-2-septate but often pale and colourless, with one brown hair noted as measuring $65 \times 8.0 \mu\text{m}$. The name was listed as a synonym of *Sphaerospora brunnea* with a question mark by Seaver (1928) and the synonymy is confirmed here. As no specific collection is cited in the protologue of *Peziza schizospora*, there is no holotype for this name although a specimen 'England. Shrewsbury, on charcoal bed /9.1872 (K - ex Phill. - holotype)' was cited by Schumacher (1988). This citation may be regarded as effective lectotypification. However, examination of material preserved under this name in K reveals no specimen so labelled. The original material was apparently separated into several parts. One, labelled '*Peziza schizospora*, W. Phillips' in Herb. Cooke, was examined by Dr R. W. G. Dennis and his annotation on the packet states 'smooth, elliptical spores $22 \times 9 \mu$ '; thus it cannot serve as the lectotype. It cannot be determined whether the two

specimens from Arkole are in fact parts of the same collection, but they were at least collected from the same area. The one with an exact date is formally designated above as the lectotype. The specimen ex Herb. Berkeley exhibits the same characters as that from Herb. W. Phillips. There is a further specimen labelled 'Peziza, Shrewsbury, W. Phillips', which lacks precise information and was therefore not taken into account in the selection of a lectotype.

The British records of *Peziza confusa* (as *Lachnea confusa* and *Sphaerospora confusa*, were from burnt soil (Phillips 1890, Ramsbottom & Balfour-Browne 1951) whereas the type of this species was given as on 'clay in loamy soil'. There is no doubt that the British records under this name should be referred to *Sphaerospora brunnea*.

Peziza confusa was synonymised with *Sphaerospora hinnulea* by Rifai (1968), largely based on the habitat, although it was regarded as a synonym of *Sphaerospora brunnea* by Seaver (1928), possibly based on the diameter of the apothecia. Only a small amount of substrate remains in the type of *P. confusa* in Herb. Cooke, and careful examination of this material also reveals a few fragments of charcoal to be present. The isotype in Herb. W. Phillips is in better condition, and amongst this small charcoal fragments can also be found. The substrate of *Karsten F. F. Exs. No. 528* is obviously a burnt site because much charcoal is present. Thus, it is clear that the material Cooke examined was somehow linked with burning. In fact, *P. confusa* was proposed because Cooke (1875a, 1876a) was uncertain as to the identity of Albertini & Schweinitz's species, *P. brunnea*. The neotype, designated from authentic material by Rifai (1968), has fixed the name *Peziza brunnea* (syn. *Sphaerospora brunnea*), and *P. confusa* should be regarded as a synonym of that species. The substrate of *S. brunnea* has been much stressed in the past, and it seems that this species is able to grow on burnt sites of various age.

A comprehensive list of synonyms *S. brunnea*, apart from those for *Peziza hinnulea*, was provided by Rifai (1968). Amongst these is *Peziza sphaeroplea* Berk. & M. A. Curtis. However, neither the lectotype nor the additional specimen for this name examined by Rifai (1968) can now be located in K. A specimen labelled '1991, *Peziza sphaeroplea* B. & C., S. Carolina, ex herb. KJB' is probably a part separated from the lectotype. Original pencil drawings of that specimen show smooth, globose ascospores.

Sphaerospora phillipsii Masee (Brit. Fung. Fl. 4: 295, 1895; syn.: *Ciliaria phillipsii* (Masee) Boud. in Ramsb. in Trans. Br. Mycol. Soc. 4: 367, 1913) was also tentatively listed as a synonym of *S. brunnea* by Rifai (1968). Masee (1895) proposed the new species without citing any specimen and stated that the species was unknown to him. Masee's description of the new species was based on that of *Lachnea brunnea* by Phillips (1887), which was itself based on observations made by C. E. Broome. Phillips (1887) cited the specimen as 'on the ground, November, near Hereford, leg. Mr. C. E. Broome', whilst the only existing British collection named as *Peziza brunnea* in Herb. W. Phillips is from Attingham Park, 6 Nov. 1874, s. leg. (K). Examination of this specimen reveals ellipsoid ascospores rather than globose spores as given in Phillips' (1887) description. Since Masee (1895) did not cite a specimen for his new species and the specimen of Phillips (1887) cannot be located, *Sphaerospora phillipsii* should be considered as a *nomen dubium*.

Sphaerospora confusa var. *ochracea* Rehm (Ann. Mycol. 5: 467, 1907) and *S. sordida* Velen. (Mon. Disc. Bohem.: 301, 1934) were described as distinct from *Sphaerospora*

brunnea in colour. The former was raised to species level by Velenovsky (1934) and the latter was reduced to a *forma* of *Sphaerospora brunnea* by Svrček (1948). From the descriptions of these taxa, and in view of the above discussion, they are likely to prove synonymous with *Sphaerosporella brunnea*.

At least two other names are relevant to the present discussion, *viz.*, *Peziza porphyra* Berk. & M. A. Curtis and *Peziza scutelloides* Ellis (syn. *Sphaerospora scutelloides* (Ellis) Sacc.). These require revision although the latter has been regarded as a synonym of *Sphaerosporella hinnulea* by Schumacher (1988). *Peziza porphyra* as illustrated by Cooke (1876b) is reminiscent of *S. brunnea*, but we have seen no specimen of this name.

ACKNOWLEDGEMENTS

We thank Dr R. K. Brummitt and Mr N. P. Taylor for stimulating nomenclatural discussion. This study was supported by a grant from the Natural Environment Research Council (No. GR3/8284) for the project 'The Ascomycetes of Great Britain and Ireland', which is gratefully acknowledged.

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